



Appl. No. 09/443,072

Attorney Docket No. 2483-001

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of Brian A. Rosenfeld, M.D. and Michael Breslow, M.D.

Serial No.: 09/443,072

Group Art Unit: 2167

Filed: 11/18/99

Examiner: Harle, J.

For: **SYSTEM AND METHOD FOR PROVIDING CONTINUOUS, EXPERT  
NETWORK CRITICAL CARE SERVICES FROM A REMOTE LOCATION(S)**

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**AFFIDAVIT BY DR. JEFFREY SCHWARTZ**

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**RECEIVED**

**MAR 04 2004**

**GROUP 360**

I, Dr. Jeffrey Schwartz, residing at 10203 E. Crestridge Lane, Englewood, CO 80111-6215, state as follows:

1. I obtained my Doctorate degree in Medicine in 1975 from the University of Michigan.

2. My experience includes twenty-two (22) years in Intensive Care Medicine. I have had a pulmonary and critical care practice since I finished my fellowship training in 1982. Between 1982-1995, critical care comprised about 30% of my overall practice. Beginning in July, 1995, I was hired as one of six intensivists to provide 24-hour/7-day/week critical care coverage for Presbyterian-St. Lukes Medical Center in Denver, Colorado. Critical care has since made up 50-60% of my practice. We are responsible for supervising all cardio-pulmonary arrests in the hospital, supervising housestaff (University of Colorado) care in the ICU, consulting on ICU patients when requested by the attending physician, and serving on the hospital's Critical Care Committee.

3. My Curriculum Vitae is attached to provide further information regarding my background and qualifications that allow me to make the statements contained herein.

4. I have read and reviewed Patent Application Serial No.: 09/443,072 and the following U.S. Patents (collectively, the "Patent References"):

- U.S. Pat. 6,364,834 issued to Reuss, et al. entitled Method and System for Remotely Monitoring Multiple Medical Parameters in an Integrated Medical Monitoring System," (herein, the "Reuss Patent").

- U.S. Pat. 4,838,275 issued to Lee entitled, "Home Medical Surveillance System," (herein, the "Lee Patent").
- U.S. Pat. 3,646,606 issued to Buxton et al. entitled, "Physiological Monitoring System," (herein, the "Buxton Patent").

5. The Reuss Patent describes an integrated medical monitoring system having a patient monitor, a central monitor, and a remote access device. Each of these devices is tied together through an integrated communications link. The communications between various components of the system are bi-directional, an attribute described as affording the opportunity to establish monitoring parameters from remote locations, provide interactive alarms and monitoring capabilities, and provide data exchange between components of the system. The thrust of the Reuss Patent is the collection of data from monitors so that the data are *available* to a caregiver. The caregiver may view the data on a display or request the data for viewing.

The claimed inventions, as noted in the claims of the Rosenfeld/Breslow patent application, provide for 24-hour dedicated monitoring/management system and method that monitors and processes clinical data in a fashion germane to an intensivist-led care team, made up of intensive care specialists, critical care nurses and clerical support personnel, to care for patients in multiple ICU's in disparate geographic locations, either within a building or in different buildings, simultaneously and continuously. The claimed inventions facilitate the provision of patient care by a care team from a dedicated monitoring facility comprising equipment and decision support algorithms developed explicitly for this purpose. The claimed invention provides for automated warnings relating to threshold vital signs and trends in vital signs and other physiologic and laboratory data, provides assessment of those thresholds and trends for the intensivist, and makes recommendations for intervention available for consideration by the intensivist. The thresholds and trends are pre-set based upon admitting and daily diagnoses and are customizable based upon the particular patient and condition. The claimed inventions thereby relieve the care team of having to sort and deal with large volumes of unprocessed clinical and patient data.

In contrast to the present invention, the Reuss Patent describes detecting when data has been read, and characterizes this function as "particularly useful in time-sensitive medical emergency situations." (See, Col. 6, line 5-9). The claimed invention treats all data as time-sensitive. While the Reuss Patent describes automation of data acquisition, the analysis of the

transmitted data is performed post hoc and by a caregiver. Additionally, the Reuss Patent contemplates that intervention may not, in fact occur. One of the described capabilities of the Reuss invention is the ability to “determine the location of a plurality of caregivers and select an appropriate primary recipient of the alarm message based on location.” Reuss Patent, col. 5, lines 47-49. This suggests that while patient data is acquired, it may not be acted upon. This reading is bolstered by references to the bi-directional capabilities of the communications link, “which can determine that a caregiver has read and responded to a message.” Reuss Patent, col. 5, lines 3-5.

It is clear that the Reuss Patent is directed to information gathering, distribution and ad hoc evaluation, not to the automated proactive monitoring and intervention of the claimed inventions. Rather, the Reuss Patent teaches observation of patients by a caregiver and evaluation of data directly by a caregiver, rather than easing that burden through knowledge based means.

6. The Lee Patent describes an apparatus for use in a patient's home that includes special furniture on which the patient lies and sits. Embedded in this special furniture are devices that automatically sense multiple parameters related to the patient's health. The patient cooperates only passively. The parameters are so chosen to provide a profile of the patient's general state of health. The apparatus also generates electronic health-parameter signals related to the sensed parameters, and it transmits these signals from the patient's home to a central surveillance and control office. Equipment there receives the signals, displays corresponding indicia of the parameters, and transmits control signals back to the patient's apparatus. Two-way voice communication between the patient and a highly trained observer at the central office supplements the electronic measurements. The observer conducts routine diagnostic sessions except when an emergency is noted from these sessions or from a patient-initiated communication. The observer determines whether a non-routine therapeutic response is required, and if so facilitates such a response such as a transfer to a hospital for more direct care. Selection among emergency cases follows a highly refined emergency-priority hierarchy.

The Lee Patent is directed to monitoring **ambulatory patients** in a home environment. However, this monitoring is not stated to be continuous. Rather, the control office is described as having means for selecting a particular one of the patients for display of that particular patient's indicia by a displaying means. These selecting means are manually operable by a

trained observer in the office. In this system the trained observer is enabled to determine the general state of health of substantially each one of the many patients--and also to determine from this information whether a non-routine therapeutic response should be provided for substantially each patient. An emergency-priority hierarchy guides the observer in a systematic way when the observer must select, from among two or more patients requiring emergency attention, which patient to deal with first, which next, and so on.

This hierarchical approach to "monitoring" is distinct from the 24-hour, continuous care provided by the claimed inventions. The system of Lee is only intended to monitor a single patient at a time, as is typically done by physicians with outpatients. It is inconceivable that a single observer, whether a doctor or a trained intensivist, can provide quality care to plurality of acutely ill patients, such as those found in an ICU, if that same observer is charged with monitoring data streams and evaluating the data for patterns indicative of clinical changes in the condition of each of the plurality of patients.

The teachings of Applicant's disclosure challenge this old regime by providing automated tools that continuously receive the data collected from an acutely ill patient, correlate disparate physiological indicators, and apply algorithms to determine if the present and projected condition of the patient warrants proactive intervention.

7. The Buxton Patent describes an apparatus for measuring physiological parameters indicative of the condition of a patient and sending those parameters to a central monitoring station. The central monitoring station would display the parameters in analog and digital form issue an alarm signal in the event certain parameter values are detected. Viewing patient data is accomplished by selecting a patient using a switch (Figure 3, callout 122). Thus, not all patients are monitored at all times. The Buxton Patent is clearly directed to a data gathering system combined with a single event driven process to manage "emergencies." Data is presented to a single operator and, except for certain alarm conditions, the evaluation of that data is charged to the single operator. Applicant further submits that it is not possible for a single operator to make simultaneous, continuous, proactive evaluations of multiple patients in real-time using the system and methods taught by Buxton. Indeed, the Buxton Patent merely subscribes to the ordinary monitoring paradigm employed presently in the majority of hospitals.

By contrast, the claimed inventions are directed to systems and methods for providing care to each patient in an ICU simultaneously on a 24-hour basis.

8. Even assuming that one skilled in the art were motivated to combine the references as suggested by the examiner, regardless of the how the references are combined, the combination will not successfully produce the results of the claimed inventions. Application of the present invention gave unexpected results with respect to patient mortality rate, length of stay, average case cost, average case contribution to margin, and monthly contribution to margin as well as extending the typical 1:12 ratio of intensivists to patients to a ratio of 1:33 in one published study and as high as 1:83 in current practice.

(a) Application of the present invention to the monitoring of a plurality of hospital ICUs resulted in a 27.1% decrease in mortality (from 12.9% to 9.4%) relative to a baseline that *included intensivists*. Although it is known that the participation of an intensivist can decrease the ICU mortality rate, it was unexpected to one of ordinary skill in the art that the addition of the remote monitoring and proactive processing of clinical data of the present invention to such ICUs would result in a further 27% decrease in mortality.

(b) Application of the present invention also decreased the average length of stay (LOS) in the study ICUs by 16.6% (from 4.35 days to 3.63 days). This decrease in LOS is significant given the increasing need for ICU beds and the solution presented by the present invention is non-obvious since many ICUs operate at full capacity, thereby requiring many acutely ill patients to be treated elsewhere in the hospital. Hospitals would surely have implemented such an improvement in throughput/capacity *if it had been obvious*.

(c) Application of the present invention also resulted in a significant decrease in the average case cost an ICU stay by 24.6%, a significant (55.7%) increase in the average case contribution margin, and a significant (65.9%) increase in the contribution margin per month. All of these saving and cost related factors are important since they enhance the ability of hospitals to provide ICU care and extend a resource that is predicted to be stretched thin. Further, any such significant cost-saving measure would have surely been implemented by hospitals *if it had been obvious*.

9. As stated above, it has been recognized that the participation of an intensivist can greatly improve ICU care. The currently recommended ratio of intensivists-to-patients is between 1:12 (multi-patient type unit) and 1:15 (single-patient type unit). Despite the knowledge

that ICU care can be improved with intensivists, the current intensivist-to-patient ratio has prevented wide adoption of the recommendation due to a lack of trained personnel. Application of the present invention has addressed long-felt but unresolved needs. That is, application of the present invention decreased mortality, LOS, and costs *while at the same time extending the intensivist-to-patient ratio by greater than 500% to 1:33- 1:83*, thereby greatly assisting in the unresolved need for more intensivists by potentially more than tripling patient access to intensivist-supervised care.

10. I believe that remote, 24-hour monitoring of ICU patients in multiple geographically disparate locations in a manner germane to an intensivist-led care team is not taught by any of the aforementioned Patent References nor would one of skill in the art make the required changes to the equipment and procedures disclosed in the Patent References to arrive at the present invention for at least the following reasons:

- The Patent References share the belief that if only physiological data can be delivered to the right person, the health of patients would be improved. Thus, each addresses means for gathering physiological data and distributing that data to a location or locations. This is a data-gathering paradigm that makes data available to experts. While the inventions may offer solutions to the problems set forth above, the references teach little more than extending the basic bedside monitoring and data collection to remote locations.
- Determining that an emergency has occurred based on the preset threshold of a single physiological parameter and issuing an alarm is an event-driven process, and is the current bedside model, not a “proactive” one. Knowing that a patient has entered an emergency state is not the same as “knowing” that a patient is entering an emergency state at some point in the future if some proactive intervention is not initiated. Further, using trending data that is acquired and saved over hours of monitoring time does not qualify as proactive. The proactive aspects of the claimed inventions envision real-time, continuous *analysis* of data on a 24-hour, 7-day per week basis.
- The invention described and claimed in Application Serial No.: 09/443,072 does not rely on the paradigm of primary monitoring by bedside personnel, with secondary calls to intensivist, but rather provides parallel processing of data in a continuous, 24-hour care of each ICU patient. The claimed inventions facilitate proactive care of

these patients by providing means by which a care team may unilaterally enter a patient's room for video and audio communication. Indeed, the high fidelity video facilitates the real time intervention supported by the claimed invention by allowing the intensivist to make a better determination of the patient's status. Using decision support algorithms, the systems and methods of the claimed inventions automatically issue alerts when a patients' vital signs or laboratory values indicate a detrimental trend and facilitate interventions with the patient when necessary. The Patent References neither teach 24-hour monitoring and proactive processing and analysis of the monitored clinical data by an intensivist-led care team nor the use of decision support algorithms to alert the intensivist of a detrimental trend in a patient's vital signs.

- Even assuming that one skilled in the art were motivated to combine the references as suggested by the examiner, regardless of the how the references are combined, the combination will not successfully produce the results of the claimed inventions. This statement is supported, if not proven, by the dramatic and unexpected results derived from practicing the teachings of Applicants disclosure as describe above.

Date: 2/20/04

Jeffrey Schwartz, MD  
\_\_\_\_\_, M.D.

Title  
Affiliation

WITNESS MY HAND and seal this 20<sup>th</sup> day of February, 2004.

LAURA ANDREFF  
Type Name Here

STATE OF COLORADO )

COUNTY OF DENVER ) ss:

On this 20<sup>th</sup> day of FEB, 2004 personally appeared before me JS Schwartz to me known, and known by me to be the same person described in and who executed the foregoing instrument, and acknowledged that he executed the same, of his own free will and for the purposes set forth.

LA Andreff  
Notary Public

My Commission Expires: 06.30.05

**JEFFREY S. SCHWARTZ, M.D., F.C.C.P.****CURRICULUM VITAE**

**Date of Birth:** March 22, 1950

**Education:** B.A. Degree in English Literature, 1971  
Phi Bet Kappa  
University of Michigan  
Ann Arbor, Michigan  
M.D. Degree, 1975  
University of Michigan Medical School, Ann Arbor, Michigan

**Post-Doctoral Training:** Medical Intern and Resident 1975-1978  
Chief Medical Resident, 1978-1979  
Michael Reese Hospital and Medical Center  
Chicago, Illinois  
Pulmonary Medicine and Critical Care Fellow, 1980-1982  
University of California Medical Center, San Diego

**Certification:** Internal Medicine, American Board of Internal Medicine, 1978  
Pulmonary Medicine, American Board of Internal Medicine, 1982  
Critical Care Medicine, American Board of Internal Medicine, 1988  
and 1998

**Professional Organizations:** Fellow of American College of Chest Physicians  
American Thoracic Society  
Colorado Medical Society  
Denver Medical Society

**Medical Licensure:** Colorado 24772

**Awards:** Outstanding Teacher of the Year  
Department of Medicine  
Saint Joseph Hospital  
Denver, Colorado 1984



J. Schwartz, MD  
Page 2 of 3**Awards:**  
(continued)

Best Teaching Attending Award  
Presbyterian/St Luke's Hospital  
Denver, Colorado, 1992

**Previous  
Experience:**

Denver Pulmonary Associates  
Denver, CO  
1982-1985

Solo Practice of Pulmonary and Critical  
Care Medicine  
Denver, CO  
1985-1987

Director  
Intensive Care Unit  
Presbyterian Denver Hospital  
1991-1992

Co-Director  
Intensive Care Unit  
Presbyterian/St. Luke's Medical Center  
1992-1994

**Present Status:**

Partner  
Colorado Pulmonary Associates, P.C.  
1721 E. 19<sup>th</sup> Ave., Suite 366  
Denver, CO 80218  
1987-present

Chief of Medicine  
St. Joseph Hospital  
Denver, CO  
1994-1998

Assistant Clinical Professor of Medicine  
Department of Medicine  
University of Colorado Health Sciences Center

**Active Staff:**

Presbyterian/St Luke's Medical Center, Denver, CO  
St. Joseph Hospital, Denver, CO  
Kindred Hospital (formerly Vencor Hospital), Denver, CO  
Select Hospital at Presbyterian/St. Luke's Medical Center  
Spaulding Rehabilitation at Presbyterian/St. Luke's Medical Center

**Publications:**

1. Schwartz JS, Kempa JS, Vasilomanolakis EC, Sizdon JP, Coe FL, Jao W: Viomycin-induced electrolyte abnormalities. *Respiration* 40: 283-292, 1980
2. Kohler JP, Rice CL, Moseley P, Schwartz JS, Zarin CK, Gould S, Moss GS: Sepsis reduces the threshold hydrostatic Pressure for pulmonary edema in baboons. *Journal of Surgical Research* 30: 124-129, 1981
3. Schwartz JS, Bencowitz H, Moser K: Air travel hypoxemia with chronic obstructive pulmonary disease. *Annals of Internal Medicine* 100: 473-477, 1984.
4. Krieger B, Schwartz JS, Loomis W, Marsh J, Spragg R: Nonspecificity of elevated angiotensin-converting enzyme Activity in bronchoalveolar lavage fluid from high permeability Lung edema states. *American Review of Respiratory Disease* 129: 499-500, 1984.
5. Schwartz JS: The cough that won't go away. *Primary Care Bulletin* 1: 9-11, 1985
6. Schwartz JS: Lasering lung cancer. *Primary Care Bulletin*, Vol. 1 No. 2, 41-42, 1986.
7. Schwartz JS: Hypoxemia during air travel. *Annals of Internal Medicine* 112: 147-148, 1990.

## **ICU Intensivist Experience**

I am presently board certified in Internal Medicine, Pulmonary Medicine, and Critical Care Medicine. I am the founding partner of a five physician Pulmonary and Critical Care practice that has a daily in-patient hospital census of 150-185 patients and has 180-200 outpatient visits per week. I am the co-director of the Residency Training Program at Rush North Shore Medical Center and the Director of the Medical Intensive Care Unit at Rush North Shore Medical Center. I conduct daily teaching rounds with Residents and Critical care fellows from Rush University. I am also the Medical Director for the Advocate HealthCare electronic ICU which is presently monitoring 110 critical care patients in four hospitals across a 50 mile radius. I work in the electronic ICU a minimum of 9 hours per week. I sit on various critical care committees at two hospitals and am a member of the Advocate HealthCare Medical Management Committee. I have been involved in the care of critical care patients on a daily basis since 1975.